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HANDY BILLY,

CONTAINING

All that has to be committed to memory by Candidates for Board of Trade Examination,

BY

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MARINE SCHOOL,

YARMOUTH, N. S.

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CLASSES OF SIGNALS:

One Flag Hoists.

C signifies, Yes. D signifies, No.

Two Flag Hoists.

BURGEE UPPERMOST, "Attention Signal."

PENNANT UPPERMOST, "Compass Signal," except when flag W is underneath, when it becomes a "Weather Signal."

SQUARE FLAG UPPERMOST, "Urgent Signal."

Three Flag Hoists.

All three flag hoists are "general signals," no matter how made up.

Four Flag Hoists.

BURGEE UPPERMOST, "Geographical Signal."

PENNANT C. D. OR F. UPPERMOST, "National Vocabulary."

PENNANT G. UPPERMOST, "Name of a man of war."

SQUARE FLAG UPPERMOST, "Name of a merchant ship."

Learn the above.

Note—The four Pennants C. D. F. G. each denote one quarter of the compass, when hoisted over any other flag; thus, C. from N. to E.; D. from E. to S.; F. from S. to W.; G. from W. to N.

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DISTANT SIGNALS:

Learn the following:

Pennant, Square flag,	B. J. Q.
Square flag, Pennant,	C. K. R.
Two Pennants,	D. L. S.
Two Square flags,	F. M. T.
One Pennant,	G. N. V.
One Square flag,	H. P. W.

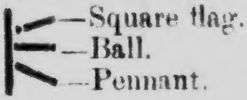
Now when a distant signal is seen, look at it without reference to the position of the ball or balls, and see which group it belongs to, having determined that, the flag will be easily known by the position of the ball or balls. If the ball, or balls, are on the top of the signal, the flag will be the first one of the group-; if the ball is in the middle, or in the case of two balls if they are divided, it will be the middle flag of the group; and if the ball, or balls are at the bottom it will be the last of the group. Thus suppose the signal made to be pennant, ball, square flag. Pennant, square flag, gives B. J. Q. Ball being in the middle, gives J.; again, suppose the signal given to be Ball, square flag, ball; one square flag gives H. P. W., Balls being divided gives the middle flag P.

SPECIAL SIGNALS.—One Ball—Stop, or answering.
Two Balls—Annul.
Ball, Pennant—You are running into danger.
Ball, Flag—Fire, or Leak, want immediate assistance.
Pennant, Ball—Short of Provisions, Starving.
Flag, Ball—Aground, want immediate assistance.

◆

SEMAPHORE:

Semaphore Signals, are made by the distant signals, the position of the Arm signifying either Ball, Square flag or Pennant thus:



DEFINITIONS:

1. **The Equator** is a great circle passing round the Earth, equi-distant from both poles.
2. **The Poles** are the two extremities of the axis of the earth.
3. **A Meridian** is a great circle, which passes through both poles.
4. **The Ecliptic** is a great circle which marks the path through the heavens, which the sun appears to travel.
5. **The Tropics** are two small circles round the Earth, each distant about 23° 28′ from the Equator.
6. **Latitude** is the arch of a meridian which lies between any given place, and the Equator.
7. **Parallels of Latitude** are small circles parallel to the Equator.
8. **Longitude** is the arch of the Equator which lies between the Meridian of Greenwich, and the meridian of any given place.
9. **The Visible Horizon** is the limit of an observer's view on a level plane.
10. **The Sensible Horizon** is an imaginary plane passing through the Eye of the Observer, parallel to the plane on which he stands.
11. **The Rational Horizon** is an imaginary plane passing through the centre of the Earth, parallel to the sensible horizon.
12. **Artificial Horizon** is a small trough, containing liquid in a state of rest, and is used for finding the altitude of an object when there is no visible horizon.
13. **True Course of a Ship** is the angle between the true Meridian, and the Ships' head.
14. **Magnetic Course** is the angle between the magnetic Meridian, and the Ships' head.
15. **Compass Course** is the angle between the Compass Meridian, and the Ships' head.
16. **Variation of the Compass** is the angle between the true North, and the Magnetic North.
17. **Deviation of the Compass** is the angle between the Magnetic North, and the Compass North.
18. **Error of the Compass** is Variation, and Deviation combined.

19. **Leeway** is the angle between the line of the Ship's keel and her wake.
20. **The Meridian Altitude** of a celestial object in its altitude when on the meridian of the place of observation.
21. **Azimuth** is the angle between the meridian of the place, and a vertical circle passing through the object.
22. **Amplitude** is the arc of the Horizon contained between the E. or W. points and the centre of a celestial object when rising or setting.
23. **Declination** is the arc of a celestial meridian contained between the object and the celestial Equator.
24. **Polar Distance** is the distance of any celestial object from the pole of the observer.
25. **Right Ascension** is the arc of the Equator intercepted between the first point of Aries, and a circle of Declination passing through the object. It is reckoned Eastward from 0h to 24h.
26. **Dip** is the angle between the Sensible Horizon, and a line drawn from the Eye of the Observer, to any point in the Visible horizon.
27. **Refraction** is the increase in an altitude, caused by the Earth's atmosphere.
28. **Parallax** is the difference between the altitude of an heavenly body, observed on the surface of the Earth, and what it would be if taken at the centre of the Earth.
29. **Semi-diameter** is half the diameter of the sun or moon.
30. **Augmentation of the Moon's Semi-diameter** is a correction to be added to the apparent semi-diameter, on account of the moon getting nearer to the observer, when rising from the horizon to the Zenith.
31. **Observed Altitude** is the altitude of any body above the horizon, measured by a sextant.
32. **Apparent Altitude** is the observed altitude corrected for index Error, and dip.
33. **True Altitude** is the apparent altitude corrected for Parallax and refraction.
34. **Zenith Distance** is the distance of a celestial object from the point of the heavens immediately over the observer.
35. **Vertical Circles** are great circles passing through the Zenith.
36. **The Prime Vertical** is that vertical circle which cuts the Horizon at the East and West points.

37. **Civil Time** is reckoned from midnight to midnight, in two divisions called A. M. and P. M.

38. **Astronomical Time** is reckoned from noon to noon continuously, reckoning from 0^h to 24^h.

39. **Sidereal Time** is the time elapsed since the first point of Aries passed the meridian.

40. **Mean time** is the time elapsed since the last transit of the mean sun.

41. **Apparent Time** is the time elapsed since the last transit of the true sun.

42. **Equation of Time** is the difference between mean and apparent time.

43. **Hour angle of a celestial object** is its distance in time East or West of the Meridian.

44. **Complement of an arc or angle** is what it wants of 90°.

45. **Supplement of an arc or angle** is what it wants of 180°.

* * *

CHART.

1. A strange chart being placed before you, what should be your especial care to determine, before you answer any questions concerning it or attempt to make any use of it.
   I would see if it was a British Chart, and also observe whether the Compasses were true or magnetic.

2. How do you ascertain that in our British Charts.
   The North and South line of a true Compass is parallel to a meridian while the North and South line of a Magnetic Compass, makes an angle E. or W. of a meridian equal to the Variation.

3. Describe how you would find the Course by the Chart between any two places A. & B.
   Lay the parallel rulers upon the two places slide them to the nearest Compass, and read off the course, which will be true or magnetic as per compass.

4. Supposing there to be points of variation at the first named place, what would the course be magnetic, the true course being about.
   Apply Easterly to the ~~right~~ left, and Westerly to the ~~left~~ right.

NOTE. In answering this question, a variation and course is given you, the blanks in the question being filled up—simply correct the given course as explained above

5. **How do you measure the distance between these two, or any other two places on the Chart?**
With a pair of dividers take the space between them, which is to be measured off on a graduated meridian, half on each side of the middle latitude.

6. **Why do you measure it in this particular manner?**
Because the degrees of latitude expand as you go from the equator to the pole.

Additional for Masters.

7. **What do you understand those small numbers to indicate that you see placed upon the chart?**
Soundings, in fathoms.

8. **At what time of tide?**
Low water, ordinary spring tides.

9. **What are the requisites you should know, in order that you may compare the depths obtained by your lead line with the depths marked on the chart?**
The time from High water, and the half mean spring range at ship.

10. **What do the Roman Numerals indicate that are occasionally seen near the coast, and in harbours?**
High water full and change.

11. **How would you find the time of High water at any place, the Admiralty tide tables not being at hand, or any other special tables available**
By adding 48 minutes [illegible] every day since full and change.

SEXTANT.

1. **What is the first adjustment of the Sextant?**
To set the index glass perpendicular to the plane of the sextant.

2. **How do you make that adjustment?**
Place the Vernier about the middle of the arc, hold the sextant horizontally with the limb from you, look obliquely into the index glass, and see it the true and reflected ~~horizons~~ arcs appear in one straight line, if not it is to be adjusted by the screws behind the glass at the base of the frame.

3. **What is the second adjustment?**
To set the Horizon glass perpendicular to the plane of the sextant

4. How do you make that adjustment ?

Place the O on the vernier to the O on the arc, hold the sextant horizontally, look through the telescope and horizon glass at the horizon, and see if the true and reflected horizons are in one straight line, if not, turn the upper screw at the back of the glass until they are.

5. What is the third adjustment ?

To set the Horizon glass parallel to the index glass.

6. Place the O on the vernier to the O on the arc hold the sextant perpendicularly, look through the telescope and horizon glass at the horizon, and see if the true and reflected horizons appear in one straight line, if not, turn the lower screw at the back of the glass until they do.

7. In the absence of screws how would you proceed ?
Find the index Error.

8. How would you find the index Error by the horizon ?
Place the O on the vernier to the O on the arc, hold the sextant perpendicularly, and looking through the telescope and horizon glass at the horizon, turn the tangent screw until the true and reflected horizons appear in one straight line, the reading on, or off the arc will be the index error.

9. How is it applied ?

Add if off the arc ; substract if on.

Questions 10 and 11 are done on the sextant.

12. How do you find the index error by the sun ?

Measure the sun's diameter, both on and off the arc, and half the difference of the two readings will be the index error.

13. How is the same applied ?

Add if the reading off the arc is the greatest, subtract if the reading on is the greatest.

14. What proof have you that these readings have been taken with tolerable accuracy ?

Add them together, and divide by 4, the result should be equal to the sun's semi-diameter, as found in the Nautical Almanac for that day.

DEVIATION OF THE COMPASS.

1. What do you mean by Deviation of the Compass?
An Error of the Compass, caused by the attraction of the iron in the Ship or cargo.

2. How do you determine the deviation *(a)* when in port, and *(b)* when at sea?
(a) By reciprocal bearings, or by the bearings of a distant object.
(b) By amplitude or Azimuth.

3. Having determined the deviation with the ship's head on the various points of the Compass, how do you know when it is Easterly, and when Westerly?
If the correct magnetic bearing is to the right of the Compass bearing, the deviation is Easterly, if to the left Westerly.

4. Why is it necessary, in order to ascertain the deviation to bring the ship's head in more than one direction?
Because the deviation varies, with every change in the direction of the ship's head.

5. For accuracy, what is the least number of points to which the ship's head should be brought?
Eight—The Cardinal and bi-cardinal points are the best.

6. How would you find the deviation when sailing along a well-known coast?
Bring two well known objects, such as light houses, in one; take the bearing and compare it with the bearings of the objects from each other, which will be found on the chart, or in the sailing directions, the difference will be the deviation.

7, 8, 9, and 10 are explained in the manual being a part of the figuring.

11. Name some suitable objects by which you could readily obtain the deviation of the Compass when sailing along the Coasts of the English Channel?
Lizards, South Foreland, or Portland lights.

12. Do you expect the deviation to change; if so, state under what circumstances?
Yes; on any considerable change of Latitude, on any change of cargo, and on an increase of heel.

13. How often is it desirable to test the accuracy of your table of Deviations?
At every opportunity.

14. State briefly what you have chiefly to guard against in selecting a position for the Compass?
It should be placed as far as possible from any mass of iron, and should not be near the extremity of any vertical iron, such as funnels, davits, spindle of capstan, &c.

15. The compasses of iron ships are more or less affected by what is termed the heeling error; on what courses does this error vanish, and on what courses is it the greatest?
Vanishes on East or West course, is greatest on North or South Course.

16. State to which side of the Ship, in the majority of cases, is the North point of the Compass drawn in the Northern Hemisphere, and what effect has it on the assumed position of the Ship when she is steering on Northerly, and also on Southerly Courses?
Generally to windward, consequently the ship will be to windward of her position on Northerly, and to leeward on Southerly Courses.

17. The effect being as you state, on what courses would you keep away, and on what courses would you keep closer to the wind, in order to make good a given Compass Course?
I would keep away on Northerly courses, and keep closer to the wind on Southerly Courses.

18. Does the same rule hold good in both Hemispheres with regard to the heeling error?
No, it generally reverses in the Southern Hemisphere.

19. Your steering Compass having a large Error, how would you proceed to correct that Compass, by compensating magnets and soft iron, in order to reduce the error within manageable limits.
Draw two chalk lines on the deck, one fore and aft, and the other athwartships, immediately under the centre of the Compass. Get the ship perfectly upright, and lay her head N. or S. correct magnetic. Provide two powerful magnets from 18 inches, to two feet in length—place one of these [illegible] ~~the~~ athwartships~~line~~, with its centre on the fore and aft line, and the N. or marked end to Starboard if the N. point of the needle is drawn to Starboard, and *vice versa*, keep the centre on the fore and aft line, and move the bar to or from the Compass until her head is N. or S. by Compass. Then get her head E. or W. correct magnetic, place the other magnet ~~on the~~ fore and aft ~~line~~, with its centre on the athwartship line, and the N or marked end aft, if the N. end of the needle is drawn towards the stern, and *vice versa*, keep the centre on the athwartship line, and move the bar to or from the Compass, until her head is E. or W. by Compass—next lay her head on one of the four point Courses. Place two boxes with soft iron on each side of the Compass, and level with the needle, add to, or reduce the iron in either box until the Compass is correct. This adjustment when once made should remain perfect, at all times, and in all latitudes.

LOG LINE.

The length of the stray line should be sufficient to allow the log chip to be clear of the eddies of the wake.

To find the length of a knot.

As the number of seconds in an hour (3600), is to the number of feet in a nautical mile (6080) so is the number of seconds run by the glass, to the length of line for glass thus for a 28 seconds glass

```
      3600 : 6080 : : 28
                28
               ----
              48640
             12160
             ------  ft.  in.
      3600)170240( 47  3.47
             14400
             ------
              26240
              25200
              -----
               1040
                 12
              -----
       3600)12480(3.46
              10800
              -----
               16800
               14400
               -----
                24000
                21600
                -----
                 2400
```

So multiply length of glass by 6080, and divide by 3600.

Lead Line.

A Hand Lead line has "nine marks" and "eleven deeps" thus

1 deep
2 two strips leather
3 three strips leather
4 deep
5 white rag
6 deep
7 red rag
8 deep
9 deep
10 leather with a hole in it
11 deep
12 deep
13 blue rag
14 deep
15 white rag
16 deep
17 red rag
18 deep
19 deep
20 cord with two knots.

Calling Soundings.—The fathoms are always prefaced by the words "By the mark" or "deep;"—thus, 7 fathoms "By the mark seven"; 9 fathoms "deep nine." The quarter and half fathoms are always prefaced by the words "and a quarter," or "and a half"; thus, 7¼ fathoms, "and a quarter seven"; 9½ fathoms, "and a half nine." The three quarter fathoms are always prefaced by the words "a quarter less" thus, 7¾ fathoms, "a quarter less eight"; 9¾ fathoms, "a quarter less ten."

A deep sea lead line is marked the same as a hand lead up to 20 fathoms, after that an additional knot for every ten fathoms, and a strip of leather for every five fathoms.

Master's Documents.

Charter Party is a contract by which a ship, or part of a ship is hired for the conveyance of goods, on certain specified conditions. It should state the nature of the voyage, the terms on which the cargo is to be carried, the penalty for non-performance, the number of lay days, whether working or running days, and amount of demurrage.

Protest.—Within 24 hours after arrival in port, the Master should go to the British Consul (or a Notary Public in a home port,) and note a protest "against wind and weather," as the term is—giving particulars of voyage, and protesting that any damage that may have occurred was caused by winds, bad weather, &c. The protest should be extended when the amount of damage is known.

Survey.—If a survey is required—which in a foreign port should consist of two Masters of vessels. The survey report should particularize the goods damaged, stating marks and numbers, and being signed must be delivered to the Master.

A Bill of Lading is a formal receipt signed by the Master, acknowledging the receipt of certain goods on board, and binding himself to deliver the same to the individual, at the place named in good order and condition—(excepting certain eventualities).—Three are signed; two stamped; one for the Shipper, one for the consignee, and the unstamped one for the Master.

A Manifest is a document containing a description of the ship and voyage, followed by a detailed account of all packages on board, their marks, numbers, destination, to whom consigned, and all other particulars of cargo, and passengers, to the best of the Master's knowledge.

Invoice is an account of goods sold or consigned, specifying the cost, and charges, description and marks of packages, together with their value, and the name of the consignee.

Bottomry Bond is a bond pledging the ship as security for money borrowed to enable the ship to continue her voyage. It is payable when she reaches her destination, but if lost the bond is cancelled. If two or more bottomry bonds be entered into on a voyage, the last is payable first, and all are paid in the reverse order of their issue. Money borrowed in this manner must be advertised for, and the lowest tender accepted.

A survey of Hatches is held by one Shipmaster who gives a Certificate that the hatches were properly battened down and secured.

Lloyd's Agent is a person employed by the underwriters to see that ships are well found, and also to report to them on any claims for damages. He has no control over the Master.

Official Log Book contains a list of the crew and has ample instructions as to what is to be entered in it Amongst other things it must contain; 1, every legal conviction of any member of the crew, and the punishment inflicted. 2, Every offence for which it is intended to prosecute, or to enforce a forfeiture, or exact a fine, together with a statement concerning the reading of the entry to the offender, and his reply thereto. 3, Every offence committed for which punishment is inflicted on board, and the punishment inflicted. 4, A statement of the character and qualification of each of his crew, or a statement that he declines to give such an opinion. 5, Every case of illness, or injury, and the medical treatment adopted. 6, Every case of death, and its cause. 7, Every birth with full particulars. 8, Every marriage with full particulars. 9, Names of any of the crew who leave the vessel either by consent or desertion, with particulars.—10, Amount of wages due any Seaman who enters Her Majesty's Service during the voyage. 11, Wages due any Seaman who dies. 12, Statement of sale of effects of any Seaman who has died, and the sum realized by it. 13, Any collision with any other ship, with details. These entries should be all signed by the Master and Mate, and in the case of sale of dead men's effects, by one other Seaman as well.

LEADING LIGHTS.

ENGLISH CHANNEL.

Bishop Rock	1	F.	
St. Agnes	1	R.	Every minute.
Seven Stones, Lt. V.	2	F.	
Longships	1	F.	*Red* towards the land.
Wolf	1	R.	Every thirty seconds. *Red* and *White* alternately.
Lizard	2	F.	Electric.
Eddystone	1	F.	
Start Point	2	R.	Every minute.
Portland Bill	2	F.	
Shambles Lt. V.	1	F.	
Needles	1	F.	
St. Catherines	1	F.	
Warner Lt. V.	1	R.	Every minute.
Nab Lt. V.	2	F.	
Owers Lt. V.	1	R.	Every thirty seconds, twice *White* and once *Red*.
Beachy Head	1	R.	Every two minutes. Light visible for 15 seconds.
Royal Sovereign Shoals Lt. V.	1	R.	Every minute, three flashes in quick succession.
Dungeness	1	F.	Electric.
Varne Shoal Lt. V.	1	R.	Every twenty seconds. *Red.*
South Foreland	2	F.	Electric.
East Goodwin Lt. V.	1	R.	Every fifteen seconds. *Green*
South Sand Head Lt. V.	1	F.	
Gull Stream Lt. V.	1	R.	Every twenty seconds.
North Sand Head Lt. V.	3	F.	Triangular.
North Foreland	1	F.	
Ushant, East end	1	F.	
Casquets	3	R.	Every twenty seconds. Triangular.
Alderney Island	2	F.	*Red.*
Cape de la Hague	1	F.	
Cape Barfleur	1	R.	Every thirty seconds.
Cape Grisnez	1	R.	Every thirty seconds.
Calais	1	F.	Flash every four minutes.

. ST. GEORGE'S CHANNEL

Skelligs	1 F.	
Calf Rock	1 F.	Flash every fifteen seconds.
Fastnet	1 R.	Every minute.
Kinsale	1 F.	
Daunts Rock Lt. V.	1 F.	*Red.*
Roche Point	1 R.	*Red,* every minute.
	1 F.	
Ballycotton	1 F.	Flash every ten seconds.
Minehead	1 R.	Every minute. Light visible for 50 seconds.
Waterford (Hook)	1 F.	
Saltees Lt. V.	2 F.	
Tuskar	1 R	Every minute. Twice *white* and once *Red.*
Lucifer Shoals Lt. V.	1 F.	*Red.*
Blackwater Bank Lt. V.	1 F.	
South Arklow Lt. V.	1 R.	Every thirty seconds.
North Arklow Lt. V.	2 F.	
Wicklow	1 R.	Every 13 seconds. Light visible for 10 seconds.
Codling Bank Lt. V.	1 R.	Every twenty seconds. *Red.*
Kish Lt. V.	1 R.	Every minute.
Bailey (Howth)	1 F.	
Rockabill	1 F.	Flash every twelve seconds.
Carlingford	2 F.	
Chicken Rock	1 R.	Every thirty seconds.
Great Orme Head	1 F.	
Point Lynus	1 R.	Every ten seconds. Light visible for 8 seconds.
Skerries	2 F.	One *White* and the other *Red*
South Stack	1 R.	Every two minutes.
Caernarvon Bay Lt.V.	1 R.	Every 20 seconds. Twice *White* and once *Red.*
Bardsey	1 F.	
Cardigan Bay Lt.V.	1 R.	Every thirty seconds. *Red.*
South Bishop	1 R.	Every twenty seconds.
Smalls	1 F.	

BAY OF FUNDY.

Cape Sable	1	R.	Every forty seconds. Light visible for 15 seconds.
Seal Island	1	F.	
Cape Fourchu	1	R.	Every one minute and three quarters. Light visible one minute and a quarter.
Cape St. Mary	1	R.	Every thirty seconds. *Red* and *White* alternately.
Briar Island	1	F.	
Grand Passage	2	F.	Horizontal.
Petit Passage (Boar's Head)	1	R.	Every minute. *Red* and *White* alternately.
Point Prim	1	F.	
Marshall Cove	2	F.	Vertical.
Margaretsville	2	F.	*Red.*
Black Rock	1	F.	
Horton Bluff	1	F.	
Burntcoat Head	1	F.	
Parrsboro'	1	F.	
Apple River	1	F.	
Cape Enrage	1	F.	
Grindstone Island	1	F.	
Quaco	1	R.	Every twenty seconds.
Cape Spencer	1	R.	Every forty five seconds. *Red* and *White* alternately.
Partridge Island	1	F.	
Point Lepreau	2	F.	Vertical.
Whitehead (Bliss Island)	1	F.	*Red.*
Wolf Island	1	R.	Every minute and a half.
Campobello Island	1	F.	
Port S. Andrew	1	F.	
Grand Manan (Swallow Tail)	1	F.	
Gannet Rock	1	F.	Flash every four and a half seconds.
Machias Seal Island	2	F.	
West Quoddy Head	1	F.	
Little River	1	F.	Flash every ninety seconds.
Moose Peak	1	R.	Every thirty seconds.
Nash's Island	1	F.	*Red.*
Petit Manan	1	F.	Flash every two minutes.
Mount Desert Rock	1	F.	
Bakers Island	1	F.	Flash every ninety seconds.
Bears Island	1	F.	